What is claimed is:

[Claim 1] A borehole caliper tool, comprising:

a tool body;
an arm coupled to the tool body, the arm being deflectable relative to the tool body;
a cam coupled to the arm such that a position of the cam changes as the arm deflects; and
a proximity sensor for sensing the position of the cam, wherein the position of the cam provides an indication of the deflection of the arm relative to the tool body.

[Claim 2] The borehole caliper tool of claim 1, wherein a pivot joint is formed between the arm and the tool body.

[Claim 3] The borehole caliper tool of claim 1, further comprising a bow spring coupled to the tool body.

[Claim 4] The borehole caliper tool of claim 3, wherein a middle portion of the bow spring includes a pad for engagement with a surface of the borehole.

[Claim 5] The borehole caliper tool of claim 3, wherein the arm is coupled to the bow spring such that the arm deflects as the bow spring flexes.

[Claim 6] The borehole caliper tool of claim 5, wherein a pivot joint is formed between the arm and the bow spring.

[Claim 7] The borehole caliper tool of claim 6, wherein a sliding joint is formed between the arm and the bow spring.

[Claim 8] The borehole caliper tool of claim 1, wherein the proximity sensor is a non-contact differential variable reluctance transducer.

[Claim 9] The borehole caliper tool of claim 1, which comprises a plurality of arms coupled to the tool body, each said arm having a cam and a proximity sensor for sensing the position of the cam coupled thereto.

[Claim 10] The borehole caliper tool of claim 9, wherein the plurality of arms, cams, and proximity sensors are distributed about a diameter of the tool body.

[Claim 11] A borehole caliper tool, comprising:

a tool body;
an arm having a first and second end, the arm being coupled to the tool body at the first end to form a pivot joint;
a cam coupled to the arm at the first end, the cam adapted to move as the arm moves relative to the tool body; and
a proximity sensor adapted to sense the position of the cam, wherein the position of the cam provides an indication of the movement of the arm relative to the tool body.

[Claim 12] The borehole caliper tool of claim 11, further comprising a bow spring coupled to the tool body.

[Claim 13] The borehole caliper tool of claim 12, wherein a middle portion of the bow spring includes a pad for engagement with a surface of the borehole.

[Claim 14] The borehole caliper tool of claim 12, wherein the arm is coupled to the bow spring at the second end and adapted to move as the bow spring flexes.

[Claim 15] The borehole caliper tool of claim 14, wherein a pivot joint is formed between the arm and the bow spring.

[Claim 16] The borehole caliper tool of claim 15, wherein a sliding joint is formed between the arm and the bow spring.

[Claim 17] The borehole caliper tool of claim 11, wherein the proximity sensor is a non-contact differential variable reluctance transducer.

[Claim 18] The borehole caliper tool of claim 11, which comprises a plurality of arms coupled to the tool body, each said arm having a cam and a proximity sensor for sensing the position of the cam coupled thereto.

[Claim 19] The borehole caliper tool of claim 18, wherein the plurality of arms, cams, and proximity sensors are distributed about a diameter of the tool body.

[Claim 20] The borehole caliper tool of claim 11, wherein the arm is rigid.

[Claim 21] A method for gauging a diameter of a borehole, comprising:

deploying a tool body carrying an arm assembly in the borehole, the arm assembly comprising an arm extending between a surface of the borehole and the tool body and deflectable relative to the tool body as the diameter of the borehole changes, the arm having a cam coupled thereto such that a position of the cam changes as the arm deflects;
monitoring the position of the cam using a proximity sensor; and
translating the position of the cam into the diameter of the borehole.